

Ecology and Evolution of Being Social (Bio/EvAnth 490)

Instructor: Emily Levy

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Meeting hours & location: 30 minutes after each class and by appointment via zoom or at location suggested by student

Course overview

Why are so many animals social? Why is there so much variance in social behavior across the animal kingdom? And what good is being social anyway?

In this course, we will learn about the ecological drivers, mechanisms, and evolutionary origins of key social behaviors – such as fighting, finding a mate, and cooperation – to understand how these behaviors evolved and how they function. We will be able to address ‘mysteries’ in the study of social behavior: why and how males of many species diverge into ‘dominant’ and ‘sneaker’ mating roles, how your past affects your future, and how cooperation can evolve when cheating pays off. Our readings will cover diverse taxa, including fungi, plants, and one of the most social species on our planet, humans.

This course will incorporate student-led discussion as well as data analysis and activities. Class preparation will be reading the primary literature and preparing for class discussions. In addition to a couple of small data analysis assignments, there will be two main assignments. For each assignment, you will pick a topic of your choice and either write a grant proposal, write a popular science article, or make a podcast. Pre-requisite: Bio 202.

Online vs. in-person course structure: All classes will be synchronous to allow for discussions and activities, but classes will be recorded in case you are absent for any reason. At this point, we will plan to have all classes online. If covid cases go down, we may have a few in-person classes outside when it's warmer. Online students will be able to zoom into these classes.

Class in the time of covid-19

Life during covid is especially challenging. The last thing this course should do is make life even more difficult. Hopefully it even makes your semester a little more fun and interesting. I aim to be understanding of how covid is affecting all of us right now, and also of the fact that it is affecting everyone differently. I will do my best to make our class a supportive and safe community. I'll also keep our class schedule flexible in case there's an especially tough few days for all of us. I'm also going to schedule 2-3 check-ins with each of you, and I'm always available if you need help in a pinch – or if I'm unable to help, I can refer you to those who can.

Class structure and readings

This upper-level seminar will meet twice a week. Classes will incorporate student-led discussions, activities, and data analysis. Most readings will be from the primary literature. You will not need to purchase a textbook.

Contacting me

I will make myself available for questions and concerns both in person (via zoom or outside from a safe distance) and via email. If you want to meet with me in person, see my meeting hours information above or email me to set up a time to meet.

My expectations of you & what you can expect from me

I do not want you to lose sleep over this course. However, I do expect you to put in the time and effort that this course requires – about 8 hours/week. I have designed the main projects and some readings so that you can pursue topics that you are excited about, which should make this course more fun and rewarding for each of you. I also expect you to behave respectfully toward your peers and myself in and outside of class.

You can expect me to be prepared for class every day, to return your assignments quickly, and to invest in your learning. I understand that you are each entering this class with a different amount of background information, and I aim to meet each of you where you are and build on your skills from there. You should also expect me to incorporate your feedback into my teaching. Finally, you should expect me to be understanding and respectful of the competing demands that each of you has – especially during this pandemic – as a student, worker, family member, etc.

Diversity, equity & inclusion

We do our best learning when we feel safe, welcome, and part of the community. I will work to create a welcoming community that values diversity of ideas, abilities, backgrounds, and identities. Likewise, I will not tolerate any behavior that disrespects others. I will also select readings from diverse STEM researchers, and I encourage you to look up the first and last authors of the papers you read to learn more about these scientists. If you have any questions, concerns, or comments about DEI in this course, please email me or come to office hours. If you want me to know anything about your identity (e.g., pronouns changed, anxiety leading discussions, disability status), please let me know in person or by email. I am also available if you need to discuss issues in the broader community – and if I'm unable to help, I can direct you to those who can.

Learning objectives

The main goals for this course are for you to engage in ecological and evolutionary thinking, increase your science literacy skills, and gain an appreciation for – or further your current interest in – the study of animal behavior. To that end, here are more detailed student learning objectives:

Students will...

1. Understand and explain the importance of studying behavior from both ecological and evolutionary angles
2. Discuss social behaviors in ecological and evolutionary contexts
3. Read, discuss, and synthesize primary literature
4. Identify and generate hypotheses and predictions about the ecology and evolution of social behavior
5. Design experiments to test hypotheses & predictions about social behavior
6. Analyze data and interpret and create data visualizations
7. Communicate scientific ideas in a clear and accessible way
8. Provide constructive feedback to peers

Assignments and grading

See list of assignments, descriptions, and point values below. For each assessment with an asterisk, I will explain in detail with a handout during class. Total points add up to 100.

Late assignments: Contact me if you have extenuating circumstances that make it challenging for you to complete an assignment on time. Otherwise, you will be docked 10% for each day that the assignment is late.

Every unexcused absence will result in losing one point from your participation grade.

Final grades will be rounded to the nearest point and assigned using following this point system:

98-100: A+	88-89: B+	78-79: C+	68-69: D+
93-97: A	83-87: B	73-77: C	60-67: D
90-92: A-	80-82: B-	70-72: C-	<60: F

Assignment	Description	Total Points
Slide show*	Before most classes, you will create 1 google drive slide about your reading.	10
Labs/data analyses*	There will be 3 types of labs/data analyses: 1. Using R, you will analyze and visualize a dataset social behavior. You will have a whole class period to work, and you will turn in a short summary of your findings. 3 points 2. Two researchers will lead us through analysis of shrimp fights. You'll first write a short ethogram of shrimp agonisms. Then after analyzing the data, you will turn in a short summary of your questions, hypotheses, predictions, methods, and findings. 4 points 3. You will spend a class period studying lemur social behavior at the Duke Lemur Center and then turn in a short report of your observations. 3 points	10
Participation	Your respectful engagement in discussions and activities will count toward your grade. I encourage you to speak at least once during every class period. We learn best when we hear from everyone!	20
Lead discussions*	You will co-lead 2 discussions with a peer. Each discussion you lead will be worth 7.5 points.	15
Main projects *	For 2 main projects, you will have a choice about what format you'd like the project to take: a grant proposal, a popular science piece, or a podcast. The projects can be about any topic related to material that we have covered in class.	<u>Project 1</u> Proposal: 2 Draft: 4 Final: 12 <u>Project 2</u> Proposal: 2 Draft: 4 Final: 16
Presentations*	You will present your final project to the class, and you will give constructive feedback on your peers' presentations. The projects will be due a few days later, so you will have time to incorporate their feedback into the final version. Note: Presentation will be <i>very informal!</i>	Presentation=3 Feedback=2

Academic integrity

You are expected to uphold the [Duke Community Standard](#):

1. I will not lie, cheat, or steal in my academic endeavors.
2. I will conduct myself honorably in all my endeavors.
3. I will act if the standard is compromised.

Plagiarism is a major concern in the scientific community and will not be tolerated. Plagiarism includes passing off another's text or ideas as your own. If you want to write about scientific findings someone else has made, that's great – just cite the work appropriately. I realize this can be a difficult skill to learn, so we will discuss citations and crediting others' work in class when I introduce the first project.

Title IX

Please know that as a Duke employee, I am a mandatory reporter. For example, if I am told of any instances of sexual assault, discrimination, or harassment, I am required to bring it to the attention of the [Office of Student Conduct](#) for issues concerning another student, or the [Office for Institutional Equity](#) for issues concerning an employee.

If you would like to talk to those offices directly, they can be reached at:

- [Office of Student Conduct](#) | conduct@duke.edu, 919-684-7336
- [Office for Institutional Equity](#) | oie.duke.edu, oie-help@duke.edu, 919-683-7336

Additionally, students can find confidential support and information at:

- [Student Ombudsperson](#) | ada.gregory@duke.edu, 919-684-6334
- [Gender Violence Prevention and Intervention](#) (Women's Center) | WCHelp@duke.edu, 919-684-3897 or 919-970-2108 (after hours)
- [Counseling and Psychological Services](#) | 919-660-1000
- [Student Health](#) | 919-681-9355
- [Durham Crisis Response Center \(DCRC\)](#) | 919-403-6562

Zoom etiquette

If you can, please try to keep your video on during class, though this is not required and you won't be graded on whether your video is on or not. I know that internet issues, laptop issues, social anxiety, and plenty of other things may factor into your decision to keep your internet off.

If you are in a quiet room, I encourage you to keep your audio on (ie, do *not* mute yourself). I've found that having to click the unmute button before speaking can be a barrier to participation.

If you lose your internet connection or need to hop off for a few minutes, no worries – and no need to let me or the class know unless it's a prolonged absence.

Show off pets and cute children! Even parents/guardians are welcome to say hi.

Missing class

If you are unable to attend class due to an illness or emergency, please fill out a [Short-Term Illness Notification Form](#). I will work with you to catch you up on anything crucial that you may have missed. Every unexcused absence will result in losing one point from your participation grade.

Schedule

Week	Date	Topic	Student-led discussion?	Assignment due
1	1/20	Social behavior I: Primer		
1	1/22	Social behavior II: Refresher	no, but there is reading	
2	1/27	Social behavior III: Methods	no, but there is reading	
2	1/29	Social behavior IV: Fitness	no, but there is reading	Introduce assignment 1
3	2/3	Group-living: Ecology & immunity	yes	
3	2/5	Group-living: Social spiders	yes	Proposal for Assignment 1
4	2/10	Evolution of cooperation	yes	
4	2/12	Cooperation: slime molds & kin selection	yes	
5	2/17	Cooperation: humans & reciprocity/punishment	yes	
5	2/19	Data analysis day	no reading	Draft of Assignment 1
6	2/24	Cooperation & collective action: warfare	yes	Data analysis due
6	2/26	Cooperative breeding & eusociality	yes	
7	3/3	Who else is social?	yes	
7	3/5	Socio-ecological model	yes	
8	3/10	SPRING BREAK!	no reading	Assignment 1 – due March 8
8	3/12	Mating: Pair-bonding	yes	
9	3/17	Mating: Strategies & adaptations	yes	Introduce assignment 2
9	3/19	Sex roles: Shifting the paradigm	yes	
10	3/24	Agonisms: shrimp	yes	Proposal for assignment 2
10	3/26	Data expedition: Analyze data	no reading	
11	3/31	Dominance hierarchies: baboons & humans	yes	Data expedition due
11	4/2	Early-life effects: primates	yes	
12	4/7	Lemur center	no reading	Draft of Assignment 2
12	4/9	Case study: Class pick	yes	
13	4/14	Case study: Class pick	yes	
13	4/16	Presentations	no reading	
14	4/21	Presentations & Wrap-up	no reading	
	4/26	No class	no reading	Assignment 2